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CommandView user interface evaluation

Preliminary heuristic analysis results

J.G. Hollands

Defence R&D Canada – Toronto
Technical Memorandum
DRDC Toronto TM 2006-039
March 2006

Canada

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Abstract

This document presents a preliminary heuristic evaluation of the CommandView user interface in use at the National Defence Command Centre. The analysis is based on Nielsen's Heuristics. In general, CommandView displays key information for the Joint staff in a comprehensive, integrated format. However, key problems involve consistency of organization. A solution may be to provide a consistent interface by providing standardized terminology across sites and dynamic control of content. A proper evaluation study involving multiple evaluators and/or usability testing is recommended to generate more representative and reliable results and generate further guidance for improvements.

Résumé

Ce document présente les résultats de l'analyse préliminaire des interfaces de CommandView. L'analyse est guidée par l'approche heuristique de Nielsen. Généralement, CommandView fourni l'information indispensable aux membres de l'état major inter armés d'une manière complète et intégrée. Par contre, la cohérence de l'organisation reste un problème majeur. La cohérence des interfaces afin d'offrir une terminologie standards au travers des sites et le control dynamique de contenu pourraient s'avérer comme une solution potentielle. Une évaluation plus rigoureuse est requise en cherchant à impliquer plusieurs évaluateurs par exemple. Des tests d'utilisation sont recommandés afin de générer des résultats plus fiables et des recommandations d'amélioration plus fondées.

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Executive summary

CommandView user interface evaluation

Hollands, J. G.; DRDC Toronto TM 2006-039; Defence R&D Canada – Toronto; March 2006.

A preliminary heuristic interface evaluation of CommandView (a system used by the Joint staff on the TITAN network) was conducted based on Nielsen's heuristics. This involved considering the user interface with reference to a fixed set of usability heuristics derived from a factor analysis of many usability problems. The ten (10) heuristics included:

- Visibility of system status,
- Match between system and real world,
- User control and freedom,
- Consistency and standards,
- Error prevention,
- Recognition rather than recall,
- Flexibility and efficiency of use,
- Aesthetic and minimalist design,
- Help users recognize, diagnose and recover from errors, and
- Help and documentation.

In general CommandView displays key information for the Joint staff in a comprehensive integrated format. However, key problems involve consistency of organization. A solution may be to provide a consistent interface by providing standardized terminology across sites and dynamic control of content.

A proper evaluation study involving multiple evaluators and/or usability testing is recommended to generate more representative and reliable results and generate further guidance for improvements.

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CommandView user interface evaluation

Hollands, J. G.; DRDC Toronto TM 2006-039; R & D pour la défense Canada – Toronto; March 2006.

Une évaluation heuristique préliminaire du CommandView a été effectuée selon les heuristiques de Nielsen. L'évaluation consistait à examiner l'interface utilisateur par rapport à une série d'heuristiques d'utilisation dérivées d'une analyse factorielle de nombreux problèmes d'utilisation. Les dix (10) heuristiques étaient :

- Visibilité du statut du système,
- Compatibilité entre système et monde réel
- Contrôle par l'utilisateur et liberté de l'utilisateur
- Cohérence et normes
- Prévention des erreurs
- Reconnaissance plutôt que rappel
- Flexibilité et efficacité d'utilisation
- Esthétique et conception minimaliste
- Aider les utilisateurs à reconnaître, à diagnostiquer et à réparer les erreurs
- Aide et documentation

De manière générale, le CommandView affiche des informations importantes pour l'état-major interarmées dans un format intégré complet. Mais, les principaux problèmes relevaient de la cohérence de l'organisation. On pourrait peut-être y remédier à l'aide d'une interface cohérente assurée par l'utilisation d'une terminologie normalisée dans tous les sites et un contrôle dynamique du contenu.

Une étude d'évaluation appropriée effectuée avec des évaluateurs multiples et/ou des essais de convivialité est à conseiller afin de produire des résultats plus significatifs et plus fiables et élaborer d'autres directives pour apporter des améliorations.

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Acknowledgements

The author thanks Denis Gouin who was also present for the some of the evaluation at DRDC Valcartier and was involved in discussion, and also Adel Guitouni and Elizabeth Woodliffe for comments and assistance.

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1. Background

This document presents a preliminary heuristic evaluation of the user interface of a system called CommandView used by the Joint Staff on the TITAN system. At the encouragement of the Lead Scientist, JCDS 21 TDP (Dr Guitouni) the process started with an initial informal evaluation, which involved access from a TITAN terminal at DRDC Valcartier. Then a more formal heuristic evaluation process was followed [1]. This involves considering the user interface with reference to a fixed set of usability heuristics derived from a factor analysis of many usability problems. This approach generally provides useful guidance for designers towards producing an effective user interface for a wide variety of software.

For this inspection the author acted as the single evaluator. The evaluation was conducted on June 29, 2005. However, for a proper heuristic evaluation multiple evaluators should perform evaluations independently. Furthermore, the best method for evaluating the utility of an interface is to conduct usability testing, which involves having actual users attempt to perform a range of representative tasks using the interface while performance measures are collected. Given the logistical difficulties in setting something like this up within a short time interval, it was decided to provide at least some feedback on the user interface for CommandView, with the caveat that the evaluation process was somewhat subjective. A more comprehensive evaluation study involving usability testing or other more formal methods should be conducted to generate more robust analysis results and generate guidance for improvements.

It would have been useful for the evaluator to have had a better understanding of the typical user's tasks and situation. The author's working assumption was that CommandView is used to see the current picture—to update on the current jointsituation, the organizations that affect it and the sources that could provide information about it.

2. General description of CommandView interface

CommandView serves as a kind of portal to information relevant to the Joint Staff (JStaff) and Canadian Forces Headquarters (CFHQs). Figure show CommandView main pages. The main page includes a map depicting various incidents around the world, with a more detailed National View on request. Left of the map are links to various elements of the JStaff, Force Generation, Allied Agencies, Standard Operating Procedures (SOPs), and Other Government Departments (OGDs). On the right are the map legend and various reference sources, including the Global Situation Brief, Incident Management System, Read File, Knowledge Base etc. Clicking on a button brings up a new page, most commonly from another site (typically the NDCC site). In this sense CommandView functions as a kind of centralized access or portal to other sites.

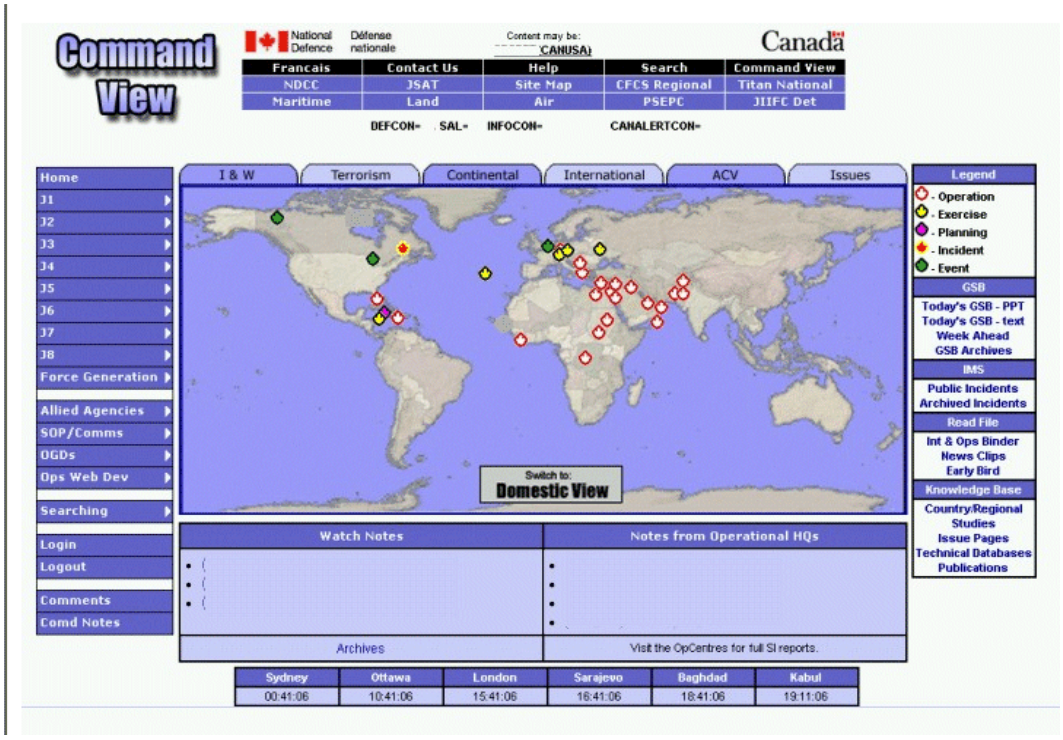

Figure 1. CommandView: International Situation View1

[1]Unclassified View of CommandView: Source DWAN.

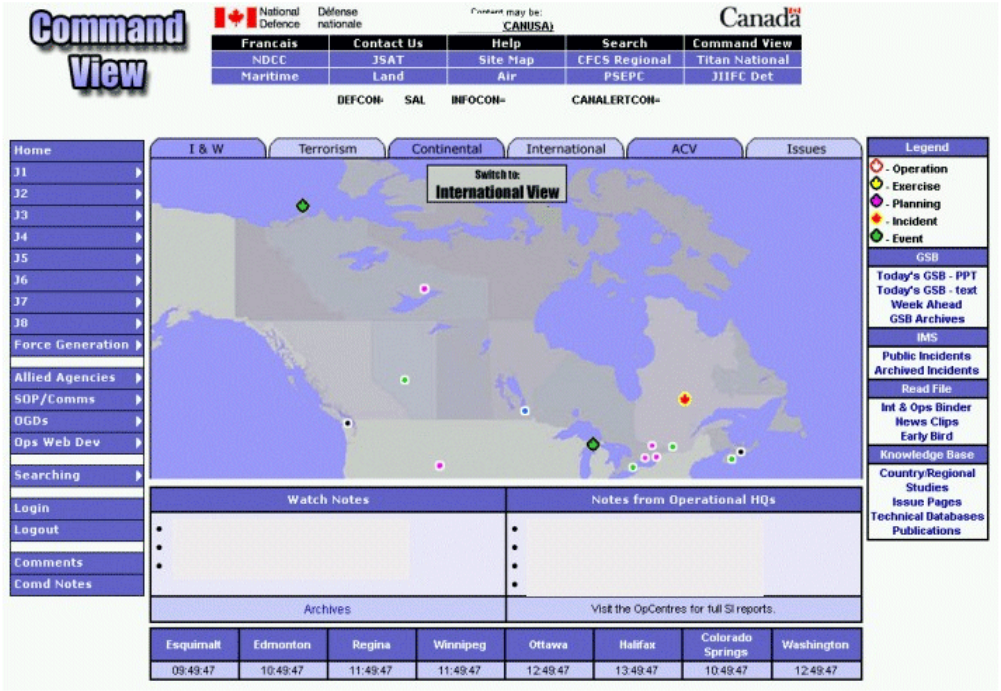

Figure 2. CommandView: Domestic Situation View 2

In general the main page succeeds as a method for bringing together relevant sources in one location—"one stop shopping" for the JStaff. The ticker tape text that highlights recent events is a nice touch. There are multiple access points to information and the map provides a useful, easily understandable view on current activities and events, and also a method for switching between domestic and international views. Recent Situation Report (Sitrep) briefings are easily accessed.

[2] Idem.

3. Nielsen's usability heuristics applied to CommandView

In this section, we present a description of ten (10) heuristics proposed by Nielsen [1] and followed by pertinent comments applicable to CommandView.

1. **Visibility of system status**: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

   CommandView: As a user, it is not clear when one has left the CommandView System. In fact, almost all the content appears to be accessed from other sites. This leads to certain problems:

   - Inconsistency: As soon as the user leaves the main CommandView page, its organizational structure is gone, replaced by whatever organization is available from the remote site. This could lead to problems with users getting lost. Beyond organization, there are appearance and terminology changes across sites.
   - Delays: There are (probably unavoidable) delays while connecting to other sites. There is a need to ensure that these delays are minimized, and when this is not possible, that the user is given an estimate of time remaining or some indication of system status as the user waits for a page to load.

2. **Match between system and real world**. The system should speak the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

   CommandView: Within the CommandView pages, the terms used seem to be sensibly chosen and appropriate for the user population. However, they are not always consistent with those found on other pages.

   Questions of organization also affect how well a system speaks the user's language. I found the organization of the CommandView main page unclear initially. There seemed to be little rationale for why particular buttons were placed in particular locations. No titles were provided for some columns of buttons, and there appears little rationale for the choices of what is positioned where (left/right, up/down) and what gets grouped together. When I found the Site Map I found links to some pages that I did not see from the main page. Site Map headings included: JStaff Nav; Force Gen Nav; Site Nav. I think an organization like this might help the main page—simply having the names may help the user group or categorize the buttons.

3. **User control and freedom**. Users often choose system functions by mistake and will need a clearly marked "*emergency exit*" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

   CommandView: The "Watch notes" (otherwise a nice idea) pop-up over the map, which blocks the view of the rest of the map and are not movable. One should allow the user to move the watch note aside. A graphical representation of the linkages between sites (using frames, for example) would be useful.

4. **Consistency and standards**. Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

CommandView: The CommandView pages consistently follow the Government of Canada (GOC) web site conventions. Again there are problems with the consistency of information presentation when visiting non-GOC sites.

There were observed problems with the consistency of clock times. The time zone clocks and Windows clock did not correspond, and neither corresponded to the actual real time during the evaluation (in one case deviating by more than an hour). This may have been a problem with the local machine. Users will have difficulty interpreting and relying on displayed times if different clocks are inconsistent.

5. **Error prevention**. Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

   CommandView: As a web interface, there are few error messages except those that occur when a page cannot load. There are few opportunities for data entry, for which lost data is a common concern.

6. **Recognition rather than recall**. Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

   CommandView: A general problem with web interfaces is that the user sees a single page at a time. This means that if information on one page is relevant to that on another it will need to be remembered by the user. Although it is possible to open multiple web pages at the same time, managing all opened pages may become problematic.

7. **Flexibility and efficiency of use**. Accelerators—unseen by the novice user—may often speed up the interaction for the expert user to such an extent that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

   CommandView: There is a fixed set of time zones available. It should be possible for a user to change these (by using drop-down menu, for example).

   No zoom facility is provided on the map (although the user can choose between a world map and a map of Canada). There are some world areas other than Canada where the joint staff might want more detail. The web-based interaction means that the CommandView user will need to scroll through multiple screens to obtain desired information. In many cases, one wants to then compare that information to information previously viewed. Then one needs to use the web browser's back function to find it, rather than being able to "jump back". Since the list of pages is finite, it would seem appropriate to attempt to organize/catalogue the pages within a hierarchical directory structure, as commonly used in many applications to allow the user to "jump" to be appropriate page.

   No search engine is provided, which might help a user determine what is available on a particular topic.

   CommandView does not save the user's workspace. Therefore, user is obliged to remember his last settings and reorganise his workspace accordingly each time.

8. **Aesthetic and minimalist design**. Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

   CommandView: The interface appears fine in this regard.

9. **Help users recognize, diagnose and recover from errors**. Error messages should be expressed in plain language (no codes), precisely indicate the problem and constructively suggest a solution.

CommandView: The interface appears fine in this regard.

10. **Help and documentation**. Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

    CommandView: No help is provided with CommandView. A help interface might present the organizational scheme to the user, and in so doing provide a chance to explore the rationale for the site's organization.

4. Other comments

The author, as evaluator, had some difficulty accessing content in the CommandView Discussion Forum. No posts could be seen despite the fact that according to statistics eight (8) posts were available.

The tabs shown at the top of the CommandView main screen were non-functional (except for indications and warning).

I suspect there is potential for more extensive functionality. For example, one might rework the information shown on other pages to standardize terminology, presentation format—a consistent ontology, using xml perhaps.

The use of a technology similar to GoogleMaps might be considered to allow quick changes in viewpoint for different theatres. The use of accelerators and a zoom facility would be useful.

It is difficult to view multiple pages at the same time with the current interface. Use of frames or web browsers that provide a method for switching between recently accessed web pages (e.g., the tabbed browsing provided by Firefox or Safari) or displaying the connectivity between pages using a multiscale interface (e.g., by showing miniaturized versions of recently accessed pages, e.g., Pad++) are suggested.

A second possibility (more long-term) is to incorporate interactive applications into the CommandView pages, make it more of a true portal which would allow dynamic control of content. Thus, for example, relevant databases could be viewed from within CommandView, and relevant data linked to current situation report data, all formatted and displayed in a consistent CommandView format.

5. Conclusion and recommendations

A preliminary heuristic interface evaluation of CommandView based on based on Nielsen's heuristics. In general CommandView displays key information for the Joint staff in a comprehensive integrated format. However, key problems involve consistency of organization. A solution may be to provide a consistent interface by providing standardized terminology across sites and dynamic control of content. A more comprehensive detailed evaluation study involving usability testing or other more formal methods is recommended to generate more representative and reliable results and generate further guidance for improvements.

References

[1] Nielsen, J. (1994). Heuristic evaluation. In J. Nielsen & R. L. Mack (Eds.), Usability inspection methods (pp. 25-103). New York: Wiley.

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CommandView User Interface Evaluation: Preliminary Heuristic Analysis Results (U)

4. AUTHORS (First name, middle initial and last name. If military, show rank, e.g. Maj. John E. Doe.)

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